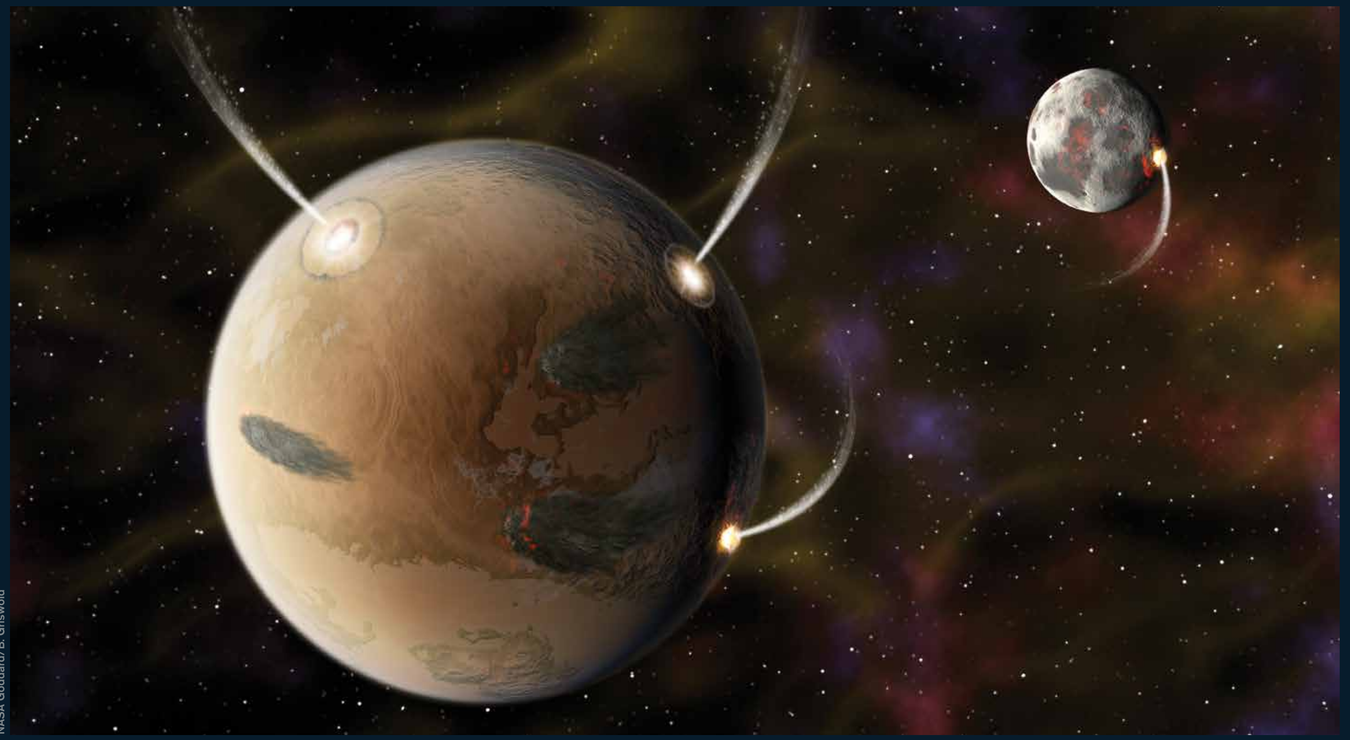
STATION 04 Goddard Initiatives

Missing: Record of Earth's Early History

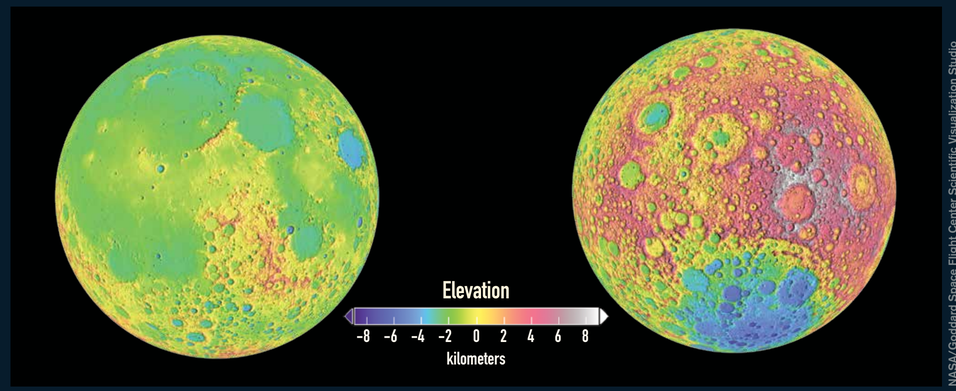
After the Moon-forming impact, bombardment continued for the next billion years. Over time, these cosmic impacts became less frequent, allowing the planet to cool and form a solid crust. However, geological activities and erosion by water and weather erased Earth's record of this early period. How do scientists learn about the events of this period? Our Moon lacks an atmosphere and plate tectonics, so it preserves a record of impacts experienced during the first one billion years and later periods. That is one reason why we explore the Moon: it holds the key to understanding early Solar System and Earth history.



NASA Goddard/B. Griswold

IMPACTS PUMMELED THE EARTH AND MOON: The record of this intense bombardment is preserved on the Moon but not on Earth. Apollo samples and lunar meteorites inform us of the ages of major impact events, while crater counting reveals the number of impacts over time.

Lunar Impact Craters



NASA/Goddard Space Flight Center Scientific Visualization Studio

OUR MANY-FACED MOON: This color-coded elevation map of the Moon's surface shows the effect of early bombardment on planetary crusts in the inner Solar System, including Earth's. Most craters on this map are over 20 kilometers in diameter. The near side (left) and far side (right) present very different cratering records, and thus appearances. These images were made using data from NASA's Lunar Reconnaissance Orbiter, built at Goddard.

DID YOU KNOW?

Scientists learned about Earth's early bombardment history by counting lunar craters of various sizes and measuring the ages of Moon rocks brought back by the Apollo astronauts. The Moon preserves a good record of these impacts.

RIGHT: Astronaut Harrison Schmitt collecting lunar rake samples during the Apollo 17 mission.

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